5   **Claims**

1. A peritoneal dialysis sampling system to be used together with a peritoneal
    dialysis system which is programmed to deliver fluid to a peritoneal cavity of

10 a patient and to drain the fluid from the cavity, said peritoneal dialysis
    system comprising a supplying line and supplying means for supplying
    dialysis fluid to the peritoneal cavity, a draining line and draining means for
    draining the fluid from the cavity, said peritoneal dialysis sampling system
    being characterized by the fact that it consists of an automatic sampling

15 system which is able to automatically sample volumic fractions of the
    dialysate contained in the peritoneum of the patient at specific time intervals
    in order to evaluate the peritoneal membrane characteristics and/or improve
    the peritoneal dialysis for a given patient.

20 2. Automatic peritoneal dialysis sampling system according to claim 1
    furthermore comprising means for defining the specific time intervals for
    sampling volumic fractions in relation with the peritoneal dialysis program
    sequences in order to better evaluate the peritoneal membrane
    characteristics and/or improve the peritoneal dialysis for a given patient..

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3. Automatic peritoneal dialysis sampling system according to any of the
    previous claims furthermore comprising means for allowing the use of
    different peritoneal dialysis liquids and/or different concentrations for each
    exchange cycle.

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4. Automatic peritoneal dialysis sampling system according to any of the
    previous claims furthermore comprising connecting means for allowing a
    connection to a Y-site on the draining which is situated between the patient
    peritoneum and the draining means of the peritoneal dialysis system in order

35 to collect samples at different intervals independently of the drain cycles.

5   5.   Automatic peritoneal dialysis sampling system according to claim 4
         furthermore comprising means for allowing the automatic sampling during
         the dwell time of the peritoneal dialysis cycle and/or during the drain cycle in
         order to improve the evaluation of the peritoneal membrane characteristics
         and/or improve the peritoneal dialysis for a given patient.

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    6.   Automatic peritoneal dialysis sampling system according to any of the claim
         4 or 5 wherein it comprises a series of sampling containers, pumping means
         and a series of valves in order to direct a certain quantity of each fluid
         sample to a given sampling container.

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    7.   Automatic peritoneal dialysis sampling system according to the previous
         claim wherein said pumping means is of a peristaltic type.

    8.   Automatic peritoneal dialysis sampling system according to any of the claims
20   1 to 3 furthermore comprising connecting means for connecting it to the
         draining line between the draining means and a waste collector in order to
         collect samples of specific drain cycles.

    9.   Automatic peritoneal dialysis sampling system according to claim 8 wherein
25   the automatic peritoneal dialysis system is composed of a series of valves
         which are controlled by an electronic system in order to direct a certain
         quantity of each fluid sample to a specific sampling container.

    10. Automatic peritoneal dialysis sampling system according to claim 9 wherein
30   the valves of such automatic peritoneal dialysis sampling system are
         controlled by the automatic peritoneal dialysis system in order to open and
         close at specific time intervals in relation with the peritoneal dialysis cycles.

    11. Automatic peritoneal dialysis sampling system according to any of the claims
35   6 or 9, wherein the valves are of an electromagnetic type.

5   12. Automatic peritoneal dialysis sampling system according to any of the previous claims furthermore comprising means for eliminating a volume of liquid between two samplings at least equivalent to the dead volume contained between the patient and the sampling level.

10   13. Peritoneal dialysis system including an automatic peritoneal dialysis sampling system according to any of the previous claims furthermore comprising an automatic peritoneal dialysis exchange system, both automatic peritoneal dialysis sampling system and automatic peritoneal dialysis exchange system being connected to the patient peritoneum and

15   comprising means for exchanging information together in order for the automatic peritoneal dialysis sampling system to determine the appropriate timing for each sampling on the basis of the dialysis exchange cycles of the automatic peritoneal dialysis exchange system.

20   14. Peritoneal dialysis sampling system according to the previous claim wherein both automatic peritoneal dialysis sampling system and automatic peritoneal dialysis exchange system are similar systems which are synchronized and which are working with different software and fluidic connections.

25   15. Automatic peritoneal dialysis sampling system according to any of the previous claims wherein it comprises a memory key which contains all the necessary data to program the functioning of said automatic peritoneal dialysis sampling system and to store the sampling information.

30   16. Automatic peritoneal dialysis sampling system according to any of the previous claims wherein sampling containers consist of soft pouches.

       17. Automatic peritoneal dialysis sampling system according to any of the previous claims 1 to 15, wherein sampling containers consist of containers

35   with vacuum in order to draw the liquid automatically when in open connection with the drawing line.

5   18. Automatic peritoneal dialysis sampling system according to any of the claims
          1 to 15, furthermore comprising means for sequentially collecting sample
          volumes in a tubing, each sample being separated from the previous one by
          an air bubble inserted by the automatic peritoneal sampling system in-
          between each sample.

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     19. Automatic peritoneal dialysis sampling system according to any of the
          previous claims 6 to 18 wherein said sampling containers are enclosed
          inside a cooling box which comprises cooling means to maintain the
          samples in optimal condition for storage until analysis.

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     20. Automatic peritoneal dialysis sampling system according to any of the
          previous claims wherein it comprises analyzing means for directly analyzing
          of at least one characteristic of the sample in-line, such as by spectroscopy,
          fluorometry or by use of chemical or electro-chemical means.

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     21. Automatic peritoneal dialysis sampling system according to the previous
          claim wherein said analyzing means allow the measurement of at least one
          of the following constituents or characteristics : glucose, urea, creatinine,
          Sodium, Chloride, albumine, proteins, osmolarity or ph.

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     22. Method of use of the automatic peritoneal dialysis sampling system
          according to any of the previous claims 20 or 21 wherein the result of the in-
          line analysis is used to optimize the next peritoneal dialysis exchange cycle
          or sampling intervals in order to improve the membrane characteristics
30   evaluation and/or improve the peritoneal dialysis for a given patient.

     23. Method of use of the automatic peritoneal dialysis sampling system
          according to any of the previous claims wherein the specific time intervals
          for sampling volumic fractions are defined in relation with the peritoneal
35   dialysis program sequences in order to better evaluate the peritoneal
          membrane characteristics and/or improve the peritoneal dialysis for a given
          patient.

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24. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 22 wherein different peritoneal dialysis liquids and/or different concentrations are used for each exchange cycle, whether it is a tidal exchange or a full exchange cycle.

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25. Method of use of the automatic peritoneal dialysis system according to any of the previous claims, wherein the automatic sampling occurs during the dwell time of the peritoneal dialysis cycle and/or during the drain cycle in order to improve the evaluation of the peritoneal membrane characteristics

15   and/or improve the peritoneal dialysis for a given patient.

26. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 21 wherein a volume of liquid at least equivalent to the dead volume contained between the patient and the sampling level is

20   eliminated between two samplings .

27. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 15 and 18 to 21, wherein the sampling volumes are sequentially collected in a tubing, each sample being separated from the

25   previous one by an air bubble inserted by the automatic peritoneal sampling system in-between each sample.

28. Method of use of the automatic peritoneal dialysis system according to any of the claims 1 to 21 wherein the samples are directly analyzed in-line, such

30   as by spectrometric, fluorometric, electro-chemical or chemical means.

29. Method of use according to the previous claim wherein the result of the in-line analysis is used to optimize the next peritoneal dialysis exchange cycle or sampling intervals in order to improve the membrane characteristics

35   evaluation and/or improve the peritoneal dialysis for a given patient.